

Lesson 6 Problem 3 Solution

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Problem 3.

Suppose it was reducible. Then both the numerator and the denominator share some factor $d > 1$. Since $d \mid 12n + 1$ we also have $d \mid 60n + 5$. But d is also a divisor of $30n + 1$, which makes it a divisor of $60n + 2$. If d is a divisor of $60n + 2$ and $60n + 5$, it also must be a divisor of their difference, 3. But $d > 1$, so it must be 3. On the other hand, $30n + 1$ cannot be divisible by 3 as 30 is, and 1 is not. This is a contradiction, which means the fraction really must be irreducible.